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15. LINCOLN: Birds of Yuma Co., Proc. Colo. Mus. Nat. Hist., Dec. 1915, p. 9.
16. BETTS: Univ. Colo. Studies, X, No. 4, 1913, p. 203.
17. WARREN: Auk, Apr. 1910, p. 147.
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19. DREW ET AL.: Ornith. and Oölogist, Oct., 1889, p. 147.
20. WARREN: Auk, July, 1916, p. 306.
21. KNIGHT: Birds of Wyoming, Univ. Wyo., Bull. No. 55, 1902, p. 109.
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23. WARREN: Condor, May, 1912, p. 97.



## WINTER ROBINS IN NOVA SCOTIA.

BY HARRISON F. LEWIS.

NEARLY every winter a few stray Robins are observed in Nova Scotia, and occasionally a small flock has been noted as present at that season, although my personal observations here during the six winters immediately previous to that of 1917-18 do not include a half dozen individuals of this species. During the winter of 1917-18, however, Robins were reported in such large numbers and over so great an area as to constitute an occurrence quite unique in the recorded ornithology of the province.

One Robin was seen by me about December 20, 1917, but unfortunately, the exact date of the observation was not recorded. In the last week of January several reports of Robins seen near Halifax were noted, and in the first two or three days of February numerous additional reports were received and I saw a few birds of this species myself. It quickly became evident that Robins were being observed near Halifax, at least, in numbers very extraordinary for the season.

As soon as it was realized that the occurrence was of an unusual character, steps were taken to secure a record of it. It is much to be regretted that, owing to the fact of the casual appearance of Robins here in ordinary winters, this realization was not reached

a few days sooner, for, in that case, attempts to obtain records from others would, no doubt, have been more successful, and my own observations would in all probability have been more extensive. It so happened that, during the time when the Robins were most abundant in this immediate vicinity, military duties, always exacting, became unusually strenuous, and for a while little thought or effort could be given by me to the birds. Nevertheless, as many observations as possible were made, and the observations of those with whom I came in contact were recorded. At the same time, I endeavored to obtain information from other parts of the province, and to that end sent numerous inquiries to those whom I knew to be interested in birds or who were likely to be interested.

Here I was greatly hindered by the present condition of the observation and study of birds in Nova Scotia. I was forced to realize that there are less than a dozen active bird students in the province, and, although there are doubtless many more than that who would note with spontaneous interest the occurrence of Robins here in midwinter, there is no organization by which I could learn of the identity of such individuals when personally unknown to me, or through which I could get into communication with them. I was forced to depend very largely upon blind guess, while following up every clue which I found, and the resulting observations, though fairly numerous, are no doubt but a small part of what might have been obtained had there been, for instance, even one trained and active observer in each county. This fact should be kept in mind when considering the records obtained as evidence of the degree of abundance of the robins.

To all who contributed observations or information concerning the Robins I wish to express my thanks. I am also under obligation to the Amherst 'News-Sentinel,' the Truro 'Daily News,' and the Glace Bay 'Gazette' for publishing, on the initiative of their respective editors, requests that information concerning winter Robins be sent to me. These requests were the means of providing me with no inconsiderable amount of valuable data.

It may be argued that observations learned of in this way are untrustworthy and therefore valueless, for, of necessity, I am not personally acquainted with many of those who so kindly furnished me with information, and I cannot definitely vouch for the skill

in bird observation of each and every one of them. It was considered, however, that, in a case of this kind, such observations might be accepted, at least as evidence tending to show a certain general condition, for nearly every intelligent adult is able to identify a Robin. Certainly, no species here is capable of more accurate popular identification, for even the well-known Crow is confused with the common Northern Raven by all but a few.

The observations obtained are summarized in the following list, which shows, in each case, the date of the observation, the locality in which it was made, the name of the observer or source of information, and the exact or approximate number of birds seen. Care has been taken to indicate any indefiniteness, so that no data are recorded as definite which were not so reported to me or observed by me. Every endeavor has been made to have the observations here recorded as definite as possible, but a number of somewhat indefinite observations are included because they are important, either geographically or temporally, in a report of this nature. With the exception of those observations where names of newspapers are quoted, and of one observation reported by Prof. H. G. Perry and one reported by Mr. W. Archibald, the name of the actual observer accompanies each observation.

December 20 (about). Bedford, N. S. (H. F. Lewis) 1.

December 27. Sydney Mines, N. S. (Miss Dawe) 1.

January 1. Ohio, Yarmouth, Co., N. S. (Mr. Cann) about 12.

January 1. Yarmouth, N. S. (Mr. H. B. Vickery) 1.

January 5 (about). Upper Musquodoboit, Halifax Co., N. S.  
(Miss Leslie) "large flock."

January 16. Glace Bay, N. S. (Mr. A. A. McDonald) 12.

"January." Bridgetown, N. S. (Mr. H. F. Williams) "several."

Daily January 20–February 6. Brookfield, Colchester Co., N. S.  
(Mr. Frank Little) 2.

January 24. Dutch Village Road, Halifax, N. S. (Mr. A. E. Brooks) 1.

"Last of January." Belmont, Colchester Co., N. S. (Miss Ruth Lear) 4.

January 26. Sydney, N. S. (Rev. T. A. Rodger) 12.

January 26. Dartmouth, N. S. (Mr. J. E. Smallman) 12.

January 27 (about). Yarmouth, N. S. ('Yarmouth Herald') of January 29) "several flocks."

January 27. Dartmouth, N. S. (Sgt. R. Smallman) about 8.

January 27 or February 3. Pugwash, N. S. (Miss B. Fullerton) 1.

January 27. Point Pleasant Park, Halifax, N.S. (Sgt. A. Cossham) 1.

January 27. William St., Halifax, N. S. (Miss H. Paul) 1.

Daily, January 27-February 8. Truro, N.S. (Prof. L. A. DeWolfe) 2.

January 28 (about). Sydney, N. S. (Mr. Geo. McLeod) "several."

January 28. Sydney, N. S. (Rev. T. A. Rodger) 20.

January 28. Amherst, N. S. (Miss D. Hurtle) 1.

January 31. Truro, N. S. (Miss E. Waller) 1.

Through January and first half of February. Truro, N. S. (Miss L. Schurman). 3-4.

February 1 (about). Pugwash, N. S. (Mrs. McIvor) 2.

February 1 (about). Carleton, Yarmouth Co., N. S. (Miss Mary Wyman) 1.

February 1. Yarmouth, N. S. ('Yarmouth Telegram' of February 1) several (killed by owl).

February 1. Dartmouth, N. S. (H. F. Lewis) 2.

February 2. Bedford, N. S. (H. F. Lewis) 1.

February 3. Jubilee Road, Halifax, N. S. (Sgt. W. J. Alsop) 3.

February 3. Young Av., Halifax, N. S. (Sgt. H. P. Eisner) 1.

February 3. "Africville," Halifax, N. S. (Sgt. A. G. Cossham) 1.

February 3. Ocean Terminals, Halifax, N. S. (Mr. C. Churchill) 25-30.

February 3. Kempt Road, Halifax, N. S. (H. F. Lewis) 1.

February 3. "The Common," Halifax, N. S. (Sgt. J. A. Fraser) 1.

February 3. Dartmouth, N. S. (H. F. Lewis) 1.

February 4. Dartmouth, N. S. (H. F. Lewis) 1.

February 5 (about). Wolfville, N. S. (reported by Prof. H. G. Perry) 12-18.

February 5. Gottingen St., Halifax, N. S. ('Evening Mail' of February 14) 1.

February 6. Truro, N. S. (Prof. E. C. Allen) 2.

February 8. Loganville, Pictou Co., N. S. (Mr. Wm. McNeil) 4-5.

February 8. South End, Halifax, N. S. (H. F. Lewis) 5.

February 9. Truro, N. S. (Prof. E. C. Allen) 1.

February 11. Truro, N. S. (Prof. E. C. Allen) 1.

- February 12. Dartmouth, N. S. (H. F. Lewis) 1.  
February 13 (about). Glenwood, Yarmouth Co., N. S., (Mr. R. M. Sargent) about 12.  
February 13 and for some time previously. Pictou, N. S. (Mr. A. Scott Dawson) 30-40.  
February 16. Amherst, N. S. (Mrs. H. T. Holmes) 2.  
February 18. Dartmouth, N. S. (H. F. Lewis) 1.  
"All winter," previous to February 19. Wolfville, N. S. (Mr. Gormley) "a few."  
February 21. Antigonish, N. S. (Mr. R. Archibald) 1.  
February 24. Pictou, N. S. (reported by Mr. W. Archibald) "several."  
February 25. 'The Common,' Halifax, N. S. (Mr. H. B. Vickery) 1.

It will be noted that the points from which Robins are reported are scattered throughout the province, from Sydney and Glace Bay in the east to Yarmouth in the west, and from Amherst, on the New Brunswick boundary, to places such as Halifax and Glenwood, on the south shore. The intervening parts of the province are fairly well represented in the observations, so that these may be held to indicate a condition general in Nova Scotia. I am persuaded that the fact that there are considerable areas, such as the three counties of Shelburne, Queens, and Lunenburg, from which no observations are recorded, is due to the absence of observers there, or to my failure to get into communication with any who may have been there, rather than to the absence of winter Robins from those regions. This belief is strengthened by the fact that, in every place in the province where trained observers were known to be situated, winter Robins were reported by them.

In the case of observations made in Halifax I have recorded the street or part of the city where the birds were seen, so as to show that the distribution in the Halifax area was general, and that it is improbable that the same few birds were being recorded repeatedly by different observers. This is particularly important in connection with the observations made on February 3, on which date many observers saw Robins in and near Halifax. No two of the observations recorded for that day are from the same part of the city. It should be borne in mind, also, when considering these

records, that Dartmouth and Halifax are really parts of one area, for they are on opposite sides of Halifax Harbor, less than a mile apart.

With reference to the observations made in Halifax and Dartmouth, I wish to add that the number of indefinite observations received or learned of was very great. In the presence of a very considerable number of definite observations from that area, it was not thought best to make use of these indefinite ones, but a very fair idea of their nature and extent was gained through conversations, intentional and accidental, and through newspaper reports. After considering the matter carefully, I am of the opinion that a conservative estimate would place the number of adults who, during the winter of 1917-18, saw Robins in Dartmouth or Halifax at forty per cent of the resident adult population of all classes in the two communities. As scarcely any of these people were intentionally looking for Robins, this would indicate a degree of abundance extremely high for the time of year.

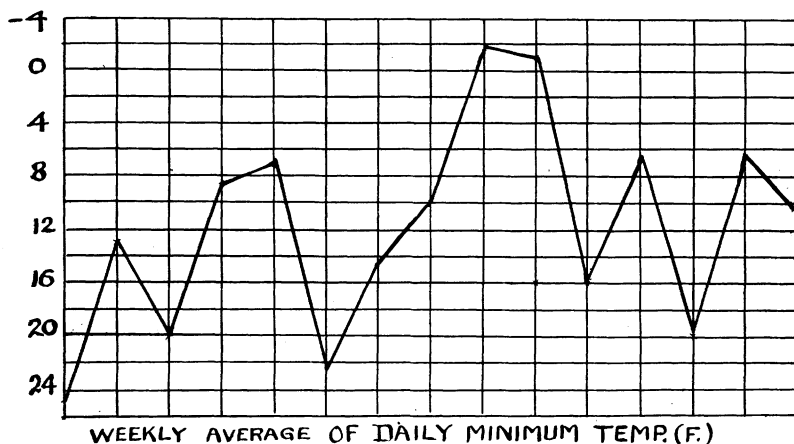
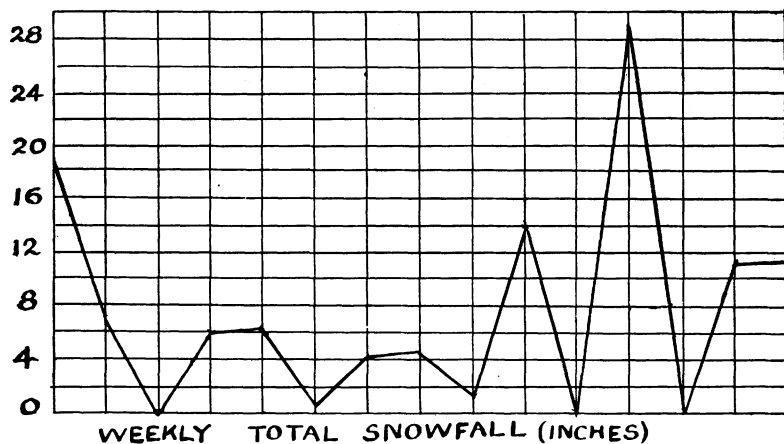
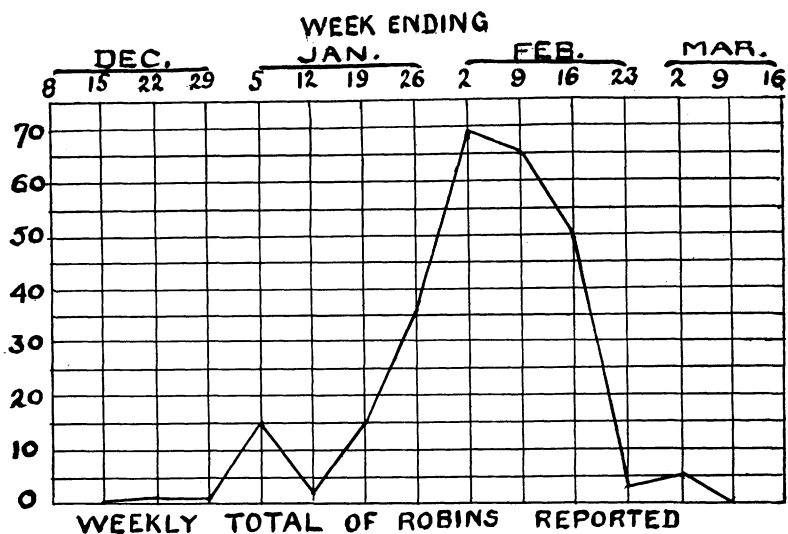
Mr. A. Scott Dawson, in his letter of February 13 concerning the large flock of Robins reported by him as remaining for some time near his residence at Pictou, says, "They spend the most of their time on the willows, and are picking at the bark; no doubt they are getting insects, etc., there. They also visit the haw bushes and the holly, as they eat both haws and berries." Those seen by Mr. Wm. McNeil at Loganville on February 8 are said to have been seeking food on a manure pile. Mrs. H. T. Holmes reports that the two Robins seen by her at Amherst on February 16 "were busily picking among some hay in search of food." Rev. T. A. Rodger states that those seen by him in Sydney were fed by his children with crumbs, and Mr. Frank Little, writing from Brookfield on March 25, says, "... this one [winter] between January 20 and February 6 we fed from our back door two Robins and a flock of nine Pine Grosbeaks. It was very cold here then and both came daily between those dates." Several of the birds seen by me were in hawthorn trees, and were feeding on the fruit, which hung on the trees in considerable quantities. The two Robins seen by me at Dartmouth on February 1 were hunting along the upper edge of a low, sandy bank, where some plants of the upland cranberry remained uncovered by the snow. When I examined these plants,

a few minutes later, I could find no fruit upon them. On February 12 I saw one Robin in a mountain ash tree, planted for ornamental purposes, but it flew from the tree at my approach. There was no fruit remaining on that tree.

In several instances it was reported that the Robins were as bright and as lively as in the springtime, but the birds seen by other observers were stated to be slow and stupid, as though weak or numb. Miss Dorothy Hurtley, in a letter dated February 20, says of a Robin seen in Amherst on January 28, "I thought I could catch it, as it was stupid with cold, but it evaded me by flying a little way ahead of me." Nearly all the Robins which I saw appeared to be very loth to move, and when finally "flushed" their flight was slow, short, and uncertain. Besides the killing of some Robins at Yarmouth by an owl, two instances of Robins dying were reported. In a letter dated February 19, Mrs. H. T. Holmes says of Robins recently seen by her at Amherst, "One, while flying, seemed to falter and flutter to the ground. Hoping to revive it, it was brought in, but soon died, possibly starved." Miss Bertha Fullerton, of Pugwash, states, in a letter dated February 26, "My sister is one of the teachers here, and one morning when she went to school there was a frozen Robin on her desk. Likely some of the boys had put it there."

In order to present as clearly and briefly as possible the fluctuations in the number of Robins reported as observed at different times during the past winter, and to facilitate comparison with the local meteorological conditions at any part of that season, I have prepared three graphs, which are shown herewith. They cover the time from December 2, 1917, to March 16, 1918. The upper graph indicates, as closely as possible, the number of Robins reported to me as seen in Nova Scotia in each week of that period. The second graph shows the total number of inches of snowfall at Halifax for each week of the time considered, and the third graph presents the weekly averages of the daily minimum temperatures (Fahr.) at Halifax. To facilitate comparison, this last graph has been inverted, so that lower temperature is represented in the same way as is heavier snowfall or a greater abundance of Robins. For the data used in preparing the two lower graphs I am indebted to Mr. Fred P. Ronnan, official meteorological observer at Halifax.





From the first graph it is readily apparent that few Robins were noted in the province prior to the middle of January. After that time the number seen increased rapidly, reaching its maximum about February 1, and decreasing a little more gradually until about February 20, after which date few Robins were seen. On account of the scarcity of observers, before mentioned, this line does not show the total number of Robins which were present about the inhabited parts of Nova Scotia in any week, nor can its relation to such total numbers be readily determined. It does serve, however, as a moderately correct indicator of the relative abundance of the Robins about the inhabited parts of the province in one week as compared with another.

The graph indicating the weekly snowfall appears as a line of abrupt changes and sharp angles, showing that the variation in the snowfall from week to week was very marked. Somewhat contrary to expectation, no relation between this line and the Robin graph appears to be traceable. It is possible that, if the average depth of snow on the ground in each week could be depicted graphically, the line thus formed would show more direct relation to the weekly abundance of Robins, but, unfortunately, no data from which such a graph could be prepared are available.

The temperature graph appears to correspond very well with the slopes of the Robin graph, especially in the part of the winter prior to February 20. A period of low temperature in the week ending January 5 is found to correspond with a noticeable increase in the number of Robins reported, while higher temperature during the week ending January 12 accompanies a decrease in the number of Robins seen. From January 12 to February 2 increasingly lower average temperatures are contemporaneous with an increasing abundance of Robins observed, and the extremes of both graphs are reached in the same week. In the week ending February 9 both lines fall slightly lower, and in the next week there is a very considerable decline in both. From that time on the relationship appears less close, for a reason hereinafter stated. Such a close correspondence between the two lines as has been pointed out, however, seems most unlikely to be wholly fortuitous, and would appear to indicate that temperature is a greater factor than had been supposed in causing these birds to seek the neighborhood of man.

The question as to why these Robins were so commonly observed in Nova Scotia last winter is one which at present does not seem to be capable of definite answer, for too many of the possible contributory causes are unknown. Some efforts toward a solution of the problem are, however, here submitted.

In the first place, it would appear fair to presume that these Robins were not, as was popularly supposed, misguided arrivals from the south at an unusually early date. It seems probable that they had remained in Nova Scotia, or in regions still further north, from the time of the fall migration until the time when they were seen here. The fact that few were seen between December 1 and the middle of January is explainable by the supposition that during that time they were living in the deep woods, miles from any human being except an occasional Indian or a gang of lumbermen, and that they were then more widely scattered. In the woods at that time large quantities of juniper berries and mountain ash berries would be available for their food supply.

Whether more Robins than usual remained in Nova Scotia in this way last fall seems an open question. Mr. R. W. Tufts, of Wolfville, N. S., in a letter dated February 13, 1918, which was published in the Halifax "Morning Chronicle" of February 15, gives it as his opinion that there was no unusual number of Robins in the province last winter. He attributes the great number of Robins seen in the province at that season solely to the fact that the snowfall was heavier than usual, which, he says, covered the juniper bushes which supplied the Robins with most of their usual winter food, and so forced them to seek sustenance in the inhabited areas of the province, where they were more easily observed. In opposition to this theory it should be noted that the snowfall of last winter, though heavy, was not of a record-breaking character, while I am informed by Mr. Harry Piers, Curator of the Nova Scotia Provincial Museum, and a veteran Nova Scotian ornithologist, that the abundance of Robin observations during the winter of 1917-18 is, so far as is shown by his records or memory, absolutely without parallel. I have experienced some difficulty in obtaining records of snowfall for years other than the more recent ones, but the monthly snowfalls at Halifax for the winter of 1904-05, for instance, compare with those of the winter of 1917-18 as follows.

		<i>December</i>	<i>January</i>	<i>February</i>	<i>March</i>	<i>Total.</i>
Total snowfall } 1904-05		26.3	45.9	37.4	11.6	121.2
in inches } 1917-18		33.4	15.1	42.8	30.2	121.5

Although the totals for the two winters are practically alike, yet it will be observed that by February 1, 1918, after a snowfall of 48.5 inches in December, 1917, and January, 1918, Robins were observed as fairly common throughout Nova Scotia, whereas a snowfall of 72.2 inches in December, 1904, and January, 1905, appears to have caused no unusual observations of Robins in the province, nor is there record, so far as I can discover, of any larger number of these birds than usual being seen here at any time that winter. These facts would seem to tend to show either that in the winter of 1917-18 an unusual number of Robins did remain in this part of Canada, or that their appearance in the settled parts of the country was due to other causes than the heavy snowfall, or that both of these hypotheses are true.

It has been suggested to me by Prof. E. C. Allen, of Truro, N. S., that many of the Robins seen in Nova Scotia this winter may have spent the first part of the winter outside of this province, in the neighboring, wilder regions to the northward. In proposing this theory he says, "Granting that scattered Robins do remain [in winter] in regions north of Nova Scotia (a fact concerning which I have no evidence), would not the continued cold weather tend to drive them south, and, owing to the contour of the coast, might they not hesitate to cross the water south of us in winter, and therefore be more or less congested here? . . . It might be argued that Robins would not hesitate to cross the Atlantic strip of water south of us, as many thousands do cross in the fall. On the other hand, might it not be possible that in winter the migratory instinct might not be sufficiently strong to carry them straight out to sea over rough water?" There is need of data from New Brunswick, Prince Edward Island, and Newfoundland concerning winter Robins to throw additional light on this interesting theory.

If the number of Robins which remained here last winter was greater than usual, the cause of this condition is wholly problematical. I have not had such opportunities as I desire for observing the abundance of juniper berries and mountain ash berries in the

wilder parts of Nova Scotia last fall or this spring, but no unusual abundance or scarcity of Robin food has been revealed by such observations as I have been able to make. It may be that the migratory instinct failed last fall in a greater number of Robins than usual, and thus more of them were influenced to remain here, or it may be that subtle meteorological forces caused a change in the migration of some of these birds.

It has already been noted that low temperatures seem to have accompanied the appearance of the Robins. In what way the temperature may have caused the Robins to seek the inhabited districts I cannot say, unless it might be by temporarily congealing the surface of swampy and springy areas, which ordinarily remain open in winter weather, and from which the Robins may have obtained food when the rest of the country was covered with snow. Further investigation appears to be much needed here. While considering temperature, it is worthy of note that the past winter was exceptional for one other thing besides the unusual numbers of Robins seen — that is, for its long, unbroken periods of low temperature. A direct relation between these two phenomena may be suggested. In other parts of northern North America this low temperature seems to have caused an unusual scarcity of winter birds, but that was not the case here.

After February 25, although the weather remained severe, there appear to have been no observations of Robins in the province until the arrival of the first spring migrants, noted at Halifax on March 26. This may be due to the birds' having finally left us for a more congenial climate, but I am strongly inclined to believe that it was caused by the destruction of practically all the Robins in the province, their last available supplies of food having been exhausted. This would account for the disagreement between the Robin graph and the temperature graph after February 20. Although only two dead Robins, other than those killed by an owl, were reported, yet scarcely more than this would be expected, since most of the birds would probably die in out-of-the-way places, and would soon be covered by snow or devoured by animals.

It is hoped that the facts and suggestions here presented may throw some light on the subject of winter Robins and perhaps help to point out some new lines of inquiry, so that before long

additional observations and investigations may make the full truth of the matter clear. The observations of the winter of 1917-18 were unusual, but it is often by a study of the unusual that the usual is understood.

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## REMARKS ON BEEBE'S 'TROPICAL WILD LIFE.'

BY THOMAS E. PENARD.

IN a previous number of 'The Auk' (1918, XXXV, p. 91), Dr. Witmer Stone reviewed briefly this interesting volume published by the New York Zoölogical Society, presenting the first season's work at the tropical research station, established in British Guiana under the direction of Mr. William Beebe. The results obtained by Mr. Beebe and his associates are of such interest and importance, and the work in general so deserving of the reviewer's praise, that I feel rather reluctant in offering a few slight corrections. My observations are not intended as criticisms, and I would hardly have thought it worth while to express them, were it not for the fact that the very excellence and authoritative character of Mr. Beebe's book might perhaps have the effect of creating a few misleading impressions in regard to some minor matters with which it deals.

In Chapter VIII Mr. Beebe gives a list of the birds of the Bartica District, in which, for the sake of completeness, he includes some species collected by Whitely at the same place, and listed by Salvin in 'The Ibis' for 1885 and 1886. Twenty-two species are starred to indicate that they are new to the Colony of British Guiana. Of this number, however, at least eighteen have been previously recorded from various localities in the Colony as follows:

**Columba plumbea plumbea** VIEILLOT.—Listed by Salvin (Ibis, 1886, p. 173) from Bartica Grove and Camacusa. Percival (Birds of the Botanic Gardens, 1893, Argosy reprint, p. 6) says that it is "unfrequent in Gardens, though a common species." Dawson (Hand-list of the Birds of British Guiana, 1916, p. 51) lists it as a Colonial species. Some of these